

**REMARKS**

Reexamination and reconsideration in light of the foregoing proposed amendment to the claims and following remarks is respectfully requested.

Claims 1-17 and 20 are pending in this application. Claims 18 and 19 were canceled in a previous amendment. No new claims have been added. Claims 1, 3, 5-7 and 13-17 have been amended. No new matter has been added to the application by these amendments. Support for the amendments can be found in the original claims and at pages 4-8 of the specification and also Figs. 1, 3 and 5-11.

Applicant notes the Examiner's consideration of the information cited in the Information Disclosure Statement filed February 18, 2005, as acknowledged in the Office Action Summary. Applicant further notes the Examiner's acknowledgment of Applicant's claim for foreign priority under 35 U.S.C. § 119 and receipt of the certified priority document.

**Rejection over Beavon**

Claims 1-4, 8, 9, 13, 14 and 20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Beavon (U.S. Patent No. 2,914,457). The present invention is directed to a producing a gas turbine fuel oil from crude oil as the one and only product, i.e., the sole product produced by the method. The method disclosed in the Beavon reference produces various products such as fuel gas (via line 61) and straight run naphtha (via line 15) among the final products, and not a single product consisting of gas turbine fuel oil.

According to claim 1 of the present invention, the light oil produced in an atmospheric distillation step is subject to a further treatment of hydrotreating, while the atmospheric residue oil is separated into a light oil matter and a heavy oil matter in a first separation step. The light oil matter

thus obtained in the first separation step is then subjected to hydrotreating. The only refined oil produced in these hydrotreating steps is gas turbine fuel oil. Claim 3 of the present invention sets forth a method for producing gas turbine fuel oil wherein the heavy oil matter is produced in the first separating step is further separated into a light oil matter and a heavy oil matter in a second separation step. The light oil matter produced in the second separation step is then subjected to hydrotreating to obtain refined oil, which is also used as the gas turbine fuel oil.

In contrast, the Beavon reference teaches forming multiple products, namely, a light oil produced from the atmospheric distiller and a light oil is recovered from hydrotreater **49** and rexformer **51**. The light oil matter obtained in the vacuum pipe still and fractionator **22** (corresponding to the first separation step of the present invention) is recovered in the hydrotreater **49** and the rexformer **51**. Furthermore, the oil obtained from solvent deasphalting **28** (corresponding to the second separation step of claim 3 of the present invention) is subject to further processing in hydrotreater **34**, fluid catalytic cracker **40**, fractionator **42**, hydrotreater **49** and the rexformer **51**. Even if elements of the present invention include those of the Beavon reference, the present invention set forth completely different process steps for extracting an oil product. The Beavon reference does not disclose at which step a product the Beavon reference produces a gas turbine fuel oil.

In claims 13 and 14, the gas turbine fuel oil, the only product, is extracted from atmospheric residue oil and/or heavy oil. In claim 13, the heavy feed oil is treated in a first separation step, a light oil matter produced in the first separation step is subject to hydrotreating, and the gas turbine fuel oil obtained by hydrotreating. In claim 14, the heavy oil matter

produced in the first separation step is separated into a light oil matter and a heavy oil matter in the second separation step, and the light oil matter produced in the second separation step is subject to hydrotreating resulting in obtaining gas turbine fuel oil. The Beavon reference does not disclose at which step a product the Beavon reference produces only a gas turbine fuel oil.

The Examiner concedes that Beavon does not disclose that the products produced in the steps disclosed in the reference have the chemical and physical properties of the gas turbine fuel oil as claimed. However, the Examiner concluded that it "would have been obvious to one having ordinary skill in the art that at the time the invention was made to have produced an oil having the claimed characteristics and yield because the converted hydrocarbons consist of a wide boiling range of materials" and that the "disclosed separations of Beavon and any additional separations such as those in claim 8 would necessarily produce products of various characteristics" and that "it is within the level of ordinary skill to recover any fraction that is suitable for the desired purpose including a fuel oil for a boiler [claim 9]." The chemical and physical properties of the claimed gas turbine fuel oil, as claimed, does not include its boiling point range. The Examiner has not explained how a person having ordinary skill in the art would have known from the teachings of Beavon that a product produced by Beavon would include alkaline metal, lead, vanadium, calcium and sulfur in the ppm recited in independent claims 1, 3, 13 and 14. Beavon does not disclose or suggest the claimed metals and non-metals are present in the products having the boiling point ranges disclosed in the reference.

In the present invention, a simple arrangement of separators and hydrotreaters and the steps set forth claimed methods in independent claims 1, 3, 13 and 14 for extracting the gas

turbine fuel oil as product are devised to produce as much of the claimed gas turbine fuel oil as possible with increased yield. The present invention provides an extremely effective method to extract as much gas turbine fuel oil as possible from crude oil or heavy oil. The petroleum refining process of Beavon would not have led a person having ordinary skill in the art to the combined process steps of the present invention to obtain a maximum yield of the claimed gas turbine fuel oil having the chemical and physical properties as recited in independent claims 1, 3, 13 and 14.

For all of the reasons set forth above, the claimed invention would not have been obvious over the teachings of Beavon. Accordingly, it is respectfully requested that the rejection of claims 1-4, 8, 9, 13, 14 and 20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Beavon be reconsidered and withdrawn.

#### **Rejection Over Beavon and Kwant**

Claims 5, 10 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Beavon in view of Kwant et al. (U.S. Patent No. 4,400,264). For reasons discussed *supra*, Beavon does not disclose or suggest the invention set forth in claims 5 and 15. The arguments presented in support thereof are incorporated herein by reference. The Kwant reference does not make up for the deficiencies of Beavon.

As shown in Fig. 1, the Kwant reference discloses supplying asphaltenes-containing hydrocarbon mixture to thermal cracking (TC) zone 106 and then supplying the residual fraction obtained therefrom to hydrotreater (HT) 107. The process from vacuum pipe still and fractionator 22 to the solvent deasphalter 28 in the Beavon reference might be replaced with the

process from TC to HT in the Kwant reference. Even if so, the invention of claims 5 and 15 is still distinctive over a system constructed by replacement of such process because there is no teaching that the modification will produce a gas turbine fuel oil having the chemical and physical properties as claimed.

For all of the foregoing reasons, it is respectfully requested that the rejection of claims 5, 10 and 15 under 35 U.S.C. 103(a) as being unpatentable over Beavon in view of Kwant et al. be reconsidered and withdrawn.

**Rejection over Beavon and Yoshinaga**

Claim 11 under 35 U.S.C. 103(a) as being unpatentable over Beavon in view of Yoshinaga et al. (U.S. Patent No. 4,348,288). For reasons discussed *supra*, Beavon does not disclose or suggest the invention set forth in claim 1 from which claim 11 depends. The arguments presented in support thereof are incorporated herein by reference. The Yoshinaga reference does not make up for the deficiencies of Beavon. The Examiner only relies on Yoshinaga to disclose a desalting step. For these reasons, claim 11 is not *prima facie* obvious under 35 U.S.C. § 103(a) over the combined teachings of Beavon and Yoshinaga. It is requested that the rejection be reconsidered and withdrawn.

**Rejection over Beavon and Liu**

Claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Beavon in view of Liu (U.S. Patent No. 5,958,365) in view of Liu. For reasons discussed *supra*, Beavon does not disclose or suggest the invention set forth in claim 1 from which claim 12 depends. The arguments presented in support thereof are incorporated herein by reference. The Liu reference does not make up for the

deficiencies of Beavon. The Examiner only relies on Liu to produce hydrogen by oxidizing feed oil. For these reasons, claim 12 is not *prima facie* obvious under 35 U.S.C. § 103(a) over the combined teachings of Beavon and Liu. It is requested that the rejection be reconsidered and withdrawn.

#### **Rejection over Gwin and Kwant**

Claims 6, 7, 16 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gwin et al. (U.S. Patent No. 2,925,374) in view of Kwant et al. The Gwin reference teaches a method of supplying crude oil to a first fractionation zone **10** and producing a naphtha fraction **14** and extracting, as a product, a bottoms fraction which is charged to a deasphalting zone **24**. The deasphaltered oil in the deasphalting zone **24** is charged to the stripping zone **32** and propane is discharged as a solvent. The residue of the stripping zone is discharged from the bottoms line **36** of stripping zone **32** and is introduced into hydrotreating zone **44** by way of bottoms line **36**. The product discharged from the hydrotreating zone **44** is introduced and treated in a second stripping zone **50**. The liquid discharge from the second stripping zone is introduced into the catalytic cracking zone **62** and into a second fractionation zone **66** to produce a variety of products, namely, a gaseous hydrocarbon **68**, a high octane naphtha fraction **70**, a heating oil distillate fraction **72** and a gas oil boiling range distillate fraction **74** which is recycled back to the catalytic cracking zone and the second fractionation zone. The bottoms residuum fraction **76** is not identified, but exits from the bottom of the second fractionation zone. Gwin also discloses that one part of virgin gas oil fraction **18** discharged from the first fractionation zone **10** is treated in the catalytic cracking zone **62** and then in second fractionation zone **66** to produce the same

products set forth above. Another part of the virgin gas oil fraction **18** discharged from the first fractionation zone is introduced sequentially into the hydrotreating zone **44**, the stripping zone **50**, the catalytic cracking zone **62**, and the second fractionation zone **66** to extract a gaseous hydrocarbon overhead fraction **68**, high octane naphtha fraction **70** and heating oil fraction **72** as products.

In claim 6 of the present invention, the light oil produced in an atmospheric distillation step is subject to hydrotreating (a first hydrotreating step), and the atmospheric residue oil is subject to hydrotreating (a second hydrotreating step). The refined oil obtained in the first and the second hydrotreating steps consists of gas turbine fuel oil. According to claim 7, the heavy oil matter produced in the second hydrotreating step is separated into a light oil matter and a heavy oil matter in a separation step, and this light oil matter is also used as gas turbine fuel oil. According to the inventions of claims 16 and 17, the one and only product extracted from atmospheric residue oil and/or heavy oil is gas turbine fuel oil. In claim 16, refined oil obtained by hydrotreating the heavy oil is used gas turbine fuel oil. In claim 17, the heavy oil matter obtained by hydrotreating the heavy oil is separated into a light oil matter and a heavy oil matter in a separation step, and this light oil matter obtained here is used as gas turbine fuel oil. Therefore, the invention of claims 6, 7, 16 and 17 are distinctive over the Gwin reference in view of the Kwant reference since neither reference discloses or suggests producing a single refined product, namely a gas turbine fuel oil.

The Gwin reference discloses obtaining a large variety of products by way of lines **14, 16, 34, 68, 70 and 72**) as final products, while in the present invention gas turbine fuel oil is extracted

from crude oil as the one and only product. The gas turbine fuel oil is obtained in the first and second hydrotreating steps as well as in the separation step. The Gwin reference does not suggest such technique that only gas turbine fuel oil is extracted from crude oil as the one and only product. Furthermore, the process steps of extracting a product as disclosed in Gwin reference are completely different from the present invention. For example, the Gwin reference teaches the extraction of a naphtha fraction by way of line 14. The claims of the present invention do not require this step. Further, the Kwant reference does not make up for the deficiencies of the Gwin reference.

The Examiner only relies on Kwant as disclosing the hydrotreatment of a heavy fraction prior to a deasphalting zone. However, the technique of Kwant includes no process step for producing a gas turbine fuel oil from hydrotreatment (HT) zone 107. Further, the rejection does not explain how the Gwin process, if modified by the technique of Kwant, would provide product a gas turbine fuel oil as set forth in the claims. The rejection states a conclusion that the “quantity and quality of products will be improved” by modifying Gwin with Kwant’s technique, but the rejection does not explain what products will be improved, and how and why the products are improved by Kwant’s technique.

The Examiner concedes that neither Gwin nor Kwant disclose that any of the products produced by the processes of the references, taken alone or in combination, produce a gas turbine fuel oil having the chemical and physical properties as recited in independent claims 6, 7, 16 and 17. However, the Examiner concluded that it “would have been obvious to one having ordinary skill in the art at the time the invention was made to have produced an oil having the claimed characteristics and yield because the converted hydrocarbons of Gwin consist of a wide boiling range of materials”

and that "Gwin would necessarily produce products of various characteristics" and that "it is within the level of ordinary skill to recover any fraction that is suitable for the desired purpose including a fuel oil for a turbine." The chemical and physical properties of the claimed gas turbine fuel oil do not include its boiling point range. The Examiner has not explained how a person having ordinary skill in the art would have known from the teachings of Gwin and/or Kwant that a product produced by Gwin or as modified by Kwant would include alkaline metal, lead, vanadium, calcium and sulfur in the ppm recited in independent claims 6, 7, 16 and 17. Neither Gwin nor Kwant, taken alone or in combination, disclose or suggest the claimed metals and non-metals are present in the products having the boiling point ranges disclosed in the reference.

For all of the foregoing reasons, it is respectfully requested that the rejection of claims 6, 7, 16 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Gwin et al. in view of Kwant et al. be reconsidered and withdrawn.

### **Conclusion**

It is submitted that the claims 1-17 and 20 are patentable over the teachings of the prior art relied upon by the Examiner. Accordingly, favorable reconsideration of the claims is requested in light of the preceding amendments and remarks. Allowance of the claims is courteously solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. § 1.17 and in connection with the

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Respectfully submitted,

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